900 Series

E&P Waste Management Rules

900 Series - E&P Waste Management

- Rule 901.a. ESTABLISHES:
  - Requirements for permitting, constructing, operating, & closing pits and centralized waste management facilities.
  - Methods for managing E&P waste.
  - Procedures for responding to, reporting, and remediating spills/releases.
  - Requirements for collecting & analyzing samples.

Definition - E&P Waste

- E&P WASTES
  - Wastes associated with operations to locate or remove oil or gas from the ground or to remove impurities from such substances, and
  - Are uniquely associated with and intrinsic to oil and gas exploration, development or production operations of which are exempt from regulation under Subtitle C of the Resource Conservation and Recovery Act (RCRA), 42 USC Sections 6921, et. seq.
  - Are associated with operations to locate or remove oil or gas from the ground or to remove impurities from such substances and it shall be intrinsic to and uniquely associated with oil and gas exploration, development or production.

Definition - E&P Waste (Cont'd)

- E&P WASTES
  - For natural gas, primary field operations include those production-related activities at or near the wellhead and at the gas plant (regardless of whether or not the gas plant is at or near the wellhead), but prior to transport of the natural gas from the gas plant to market.
  - In addition, uniquely associated wastes derived from the production stream along the gas plant feeder pipelines are considered E&P wastes, even if a change of custody in the natural gas has occurred between the wellhead and the gas plant.
  - In addition, wastes uniquely associated with the operations to recover natural gas from underground storage fields are considered to be E&P waste.

E&P Waste

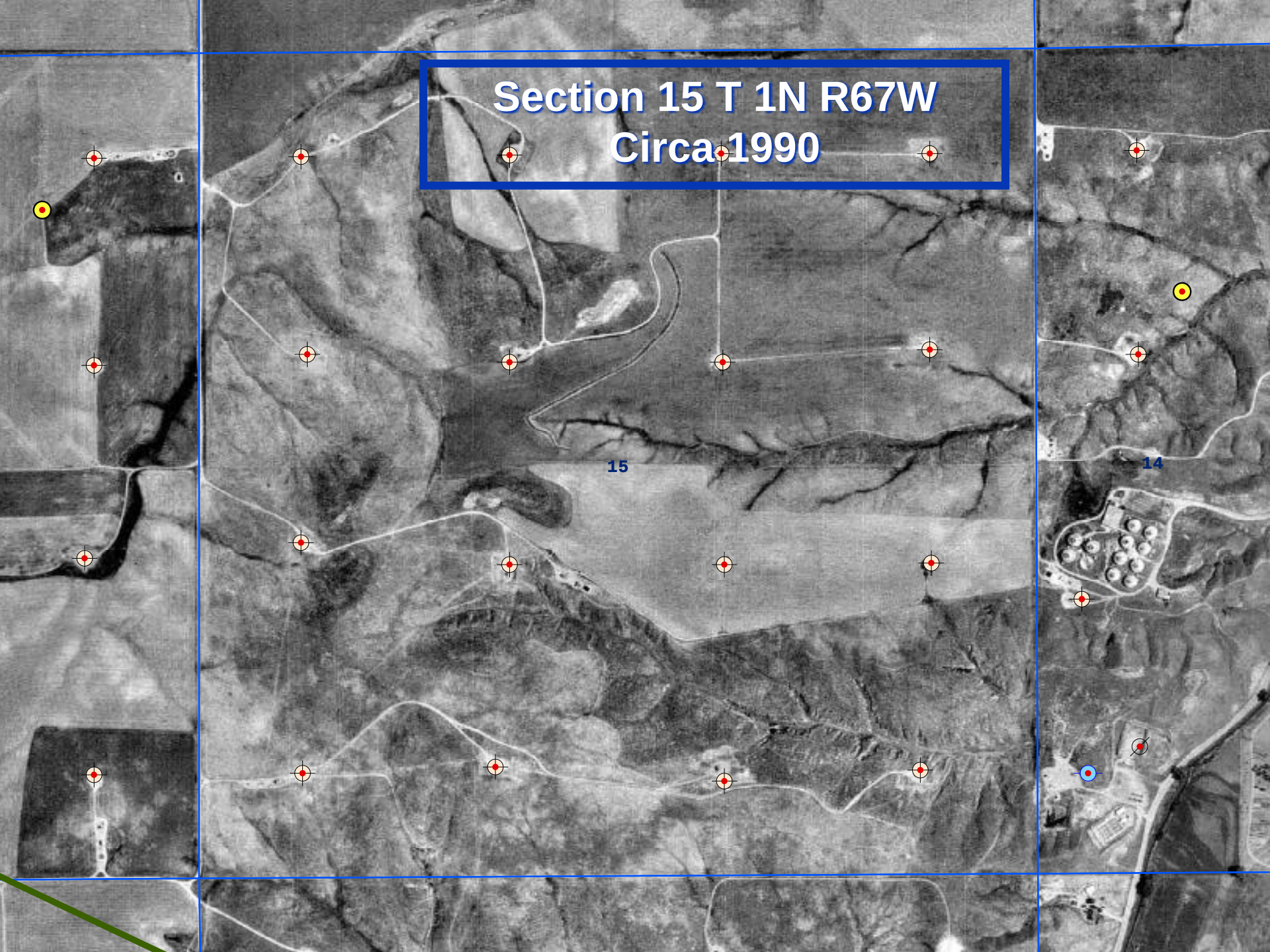
- Managing E&P Wastes in a manner that protects public health, safety, welfare, & the environment is the responsible thing to do & makes good business sense.
- Prudent waste management decisions should be based on the inherent nature of the waste.

900 Series - E&P Waste Management

- **RULE 901. INTRODUCTION**
  - 901.d. Alternative compliance methods.
  - 901.e. Sensitive area determination
  - 901.f. Sensitive area operations

901.d. Alternative Compliance Methods

- Operators can propose alternative methods for determining extent of contamination, sampling & analysis, or alternative cleanup goals using points of compliance (POC).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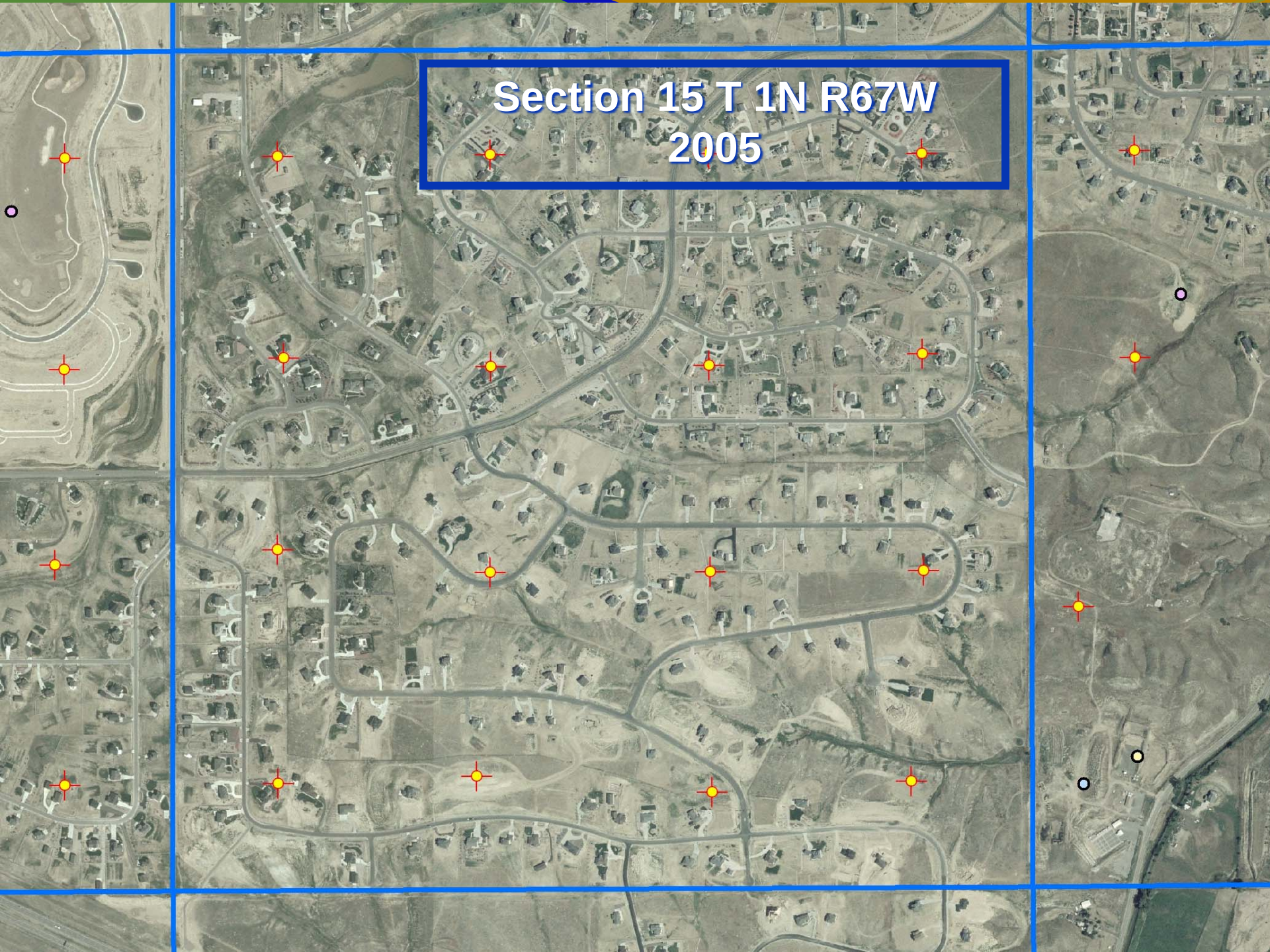
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901.e. Sensitive Area Determination

SENSITIVE AREA - Definition

Vulnerable to potential significant adverse impacts to ground water or surface water due to:

- Shallow ground water or pathways for communication with deeper ground water.
- Proximity to surface water (lakes, rivers, streams, creeks, irrigation canals, wetlands, etc).
- Ground water classified for domestic use by WQCC.
- Wellhead protection areas.
- Within 1/8 mile of domestic water well.
- Within 1/4 mile of public water supply well.
- Ground water basins designated by the Colorado Ground Water Commission.
- Surface water supply areas.

901.e. Sensitive Area Determination (Cont'd)

- When the operator or the Director have data that indicate there is an impact or a threat of impact to ground water or surface water, a sensitive area determination (SAD) may be required.
- SAD must be made using geologic & hydrogeologic data.
- SAD must demonstrate that seepage will not reach underlying ground water or surface water & will not impact current or future uses of these waters.

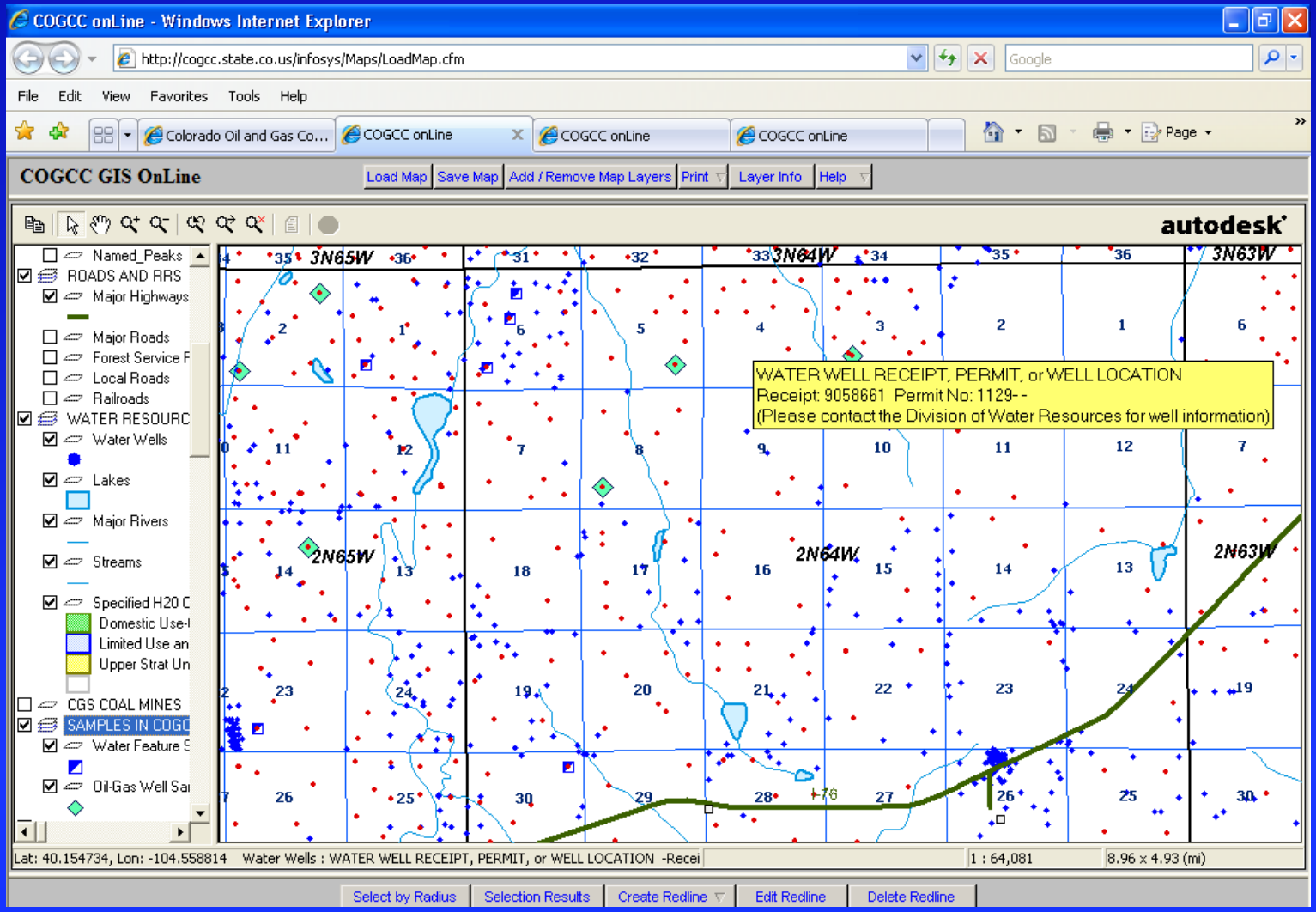
901.e. Sensitive Area Determination (Cont'd)

- **Sensitive area determination will usually be an attachment to a Form 2A or a Form 27.**
- **Data evaluated and analysis used in the determination must be submitted for review.**

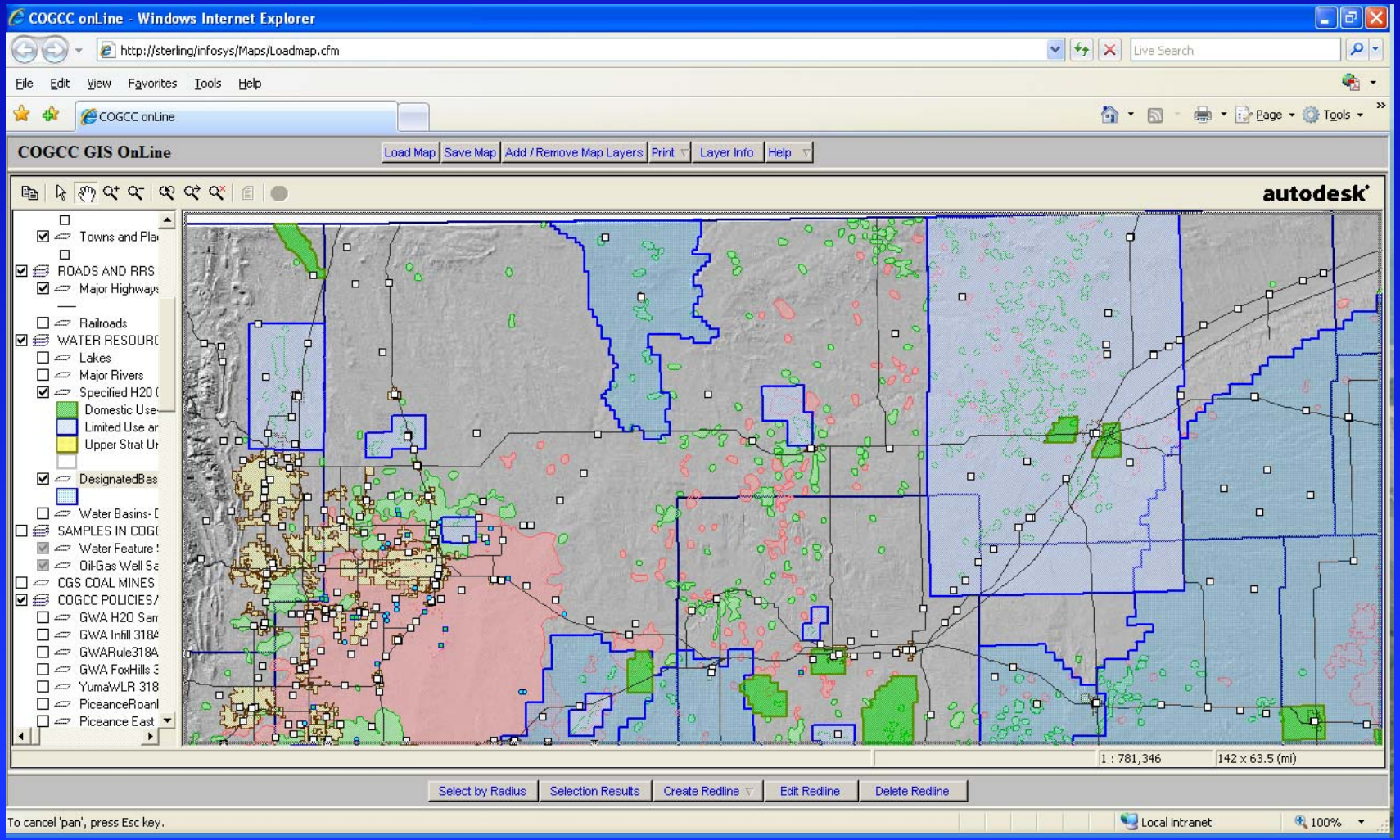
901.f. Sensitive Area Operations

- **Incorporate adequate measures & controls:**
  - **to prevent significant adverse environmental.**
  - **To ensure compliance with concentrations levels in Table 910-1**

Water Well Data Available On COGCC Website & DWR Records



Hydrogeologic Data Available On The COGCC Website



http://water.state.co.us/cgwc/DB-GWMgmtDist.htm

State of Colorado

Colorado Ground Water Commission

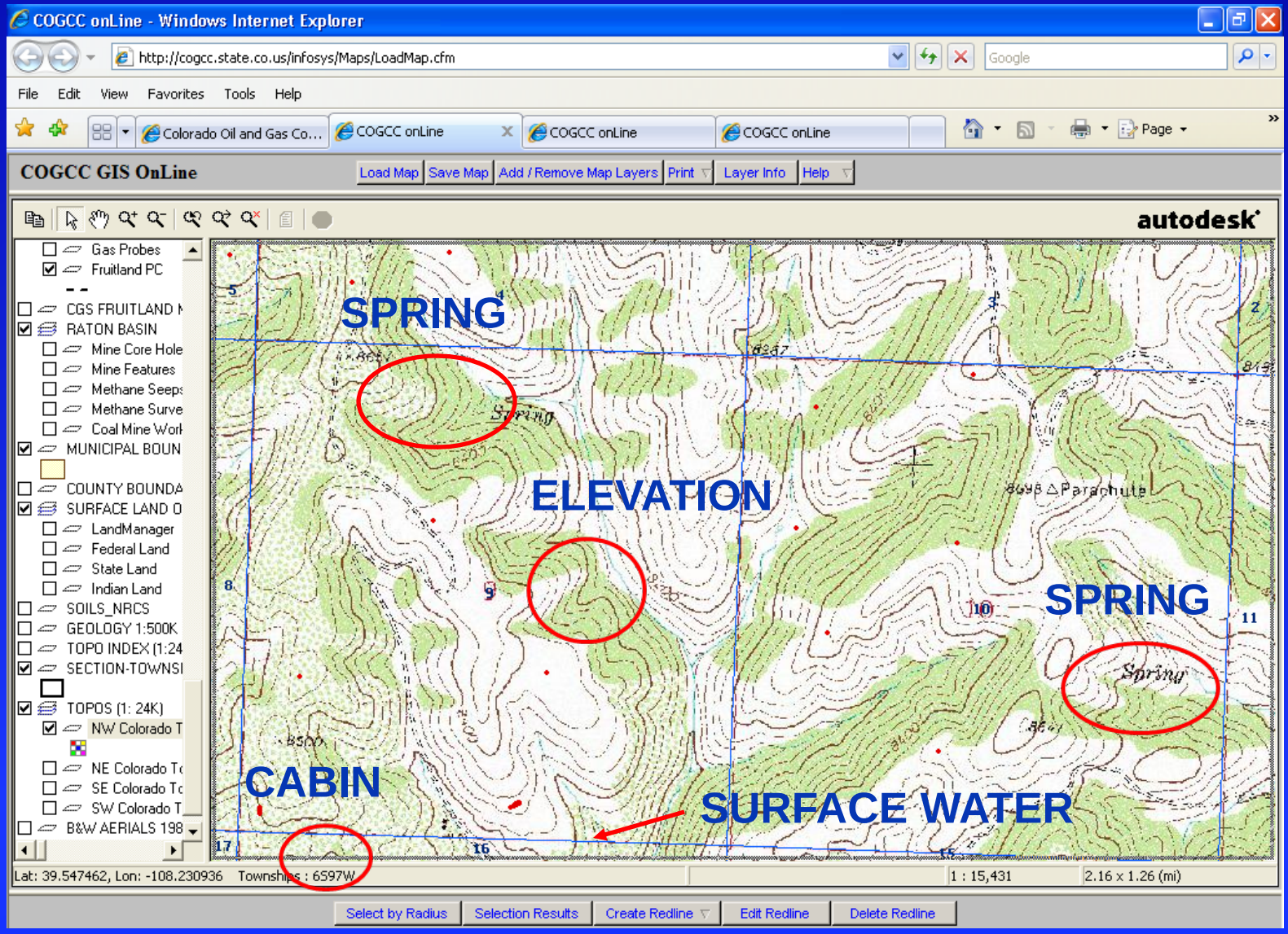
Designated Basins and Ground Water Management Districts

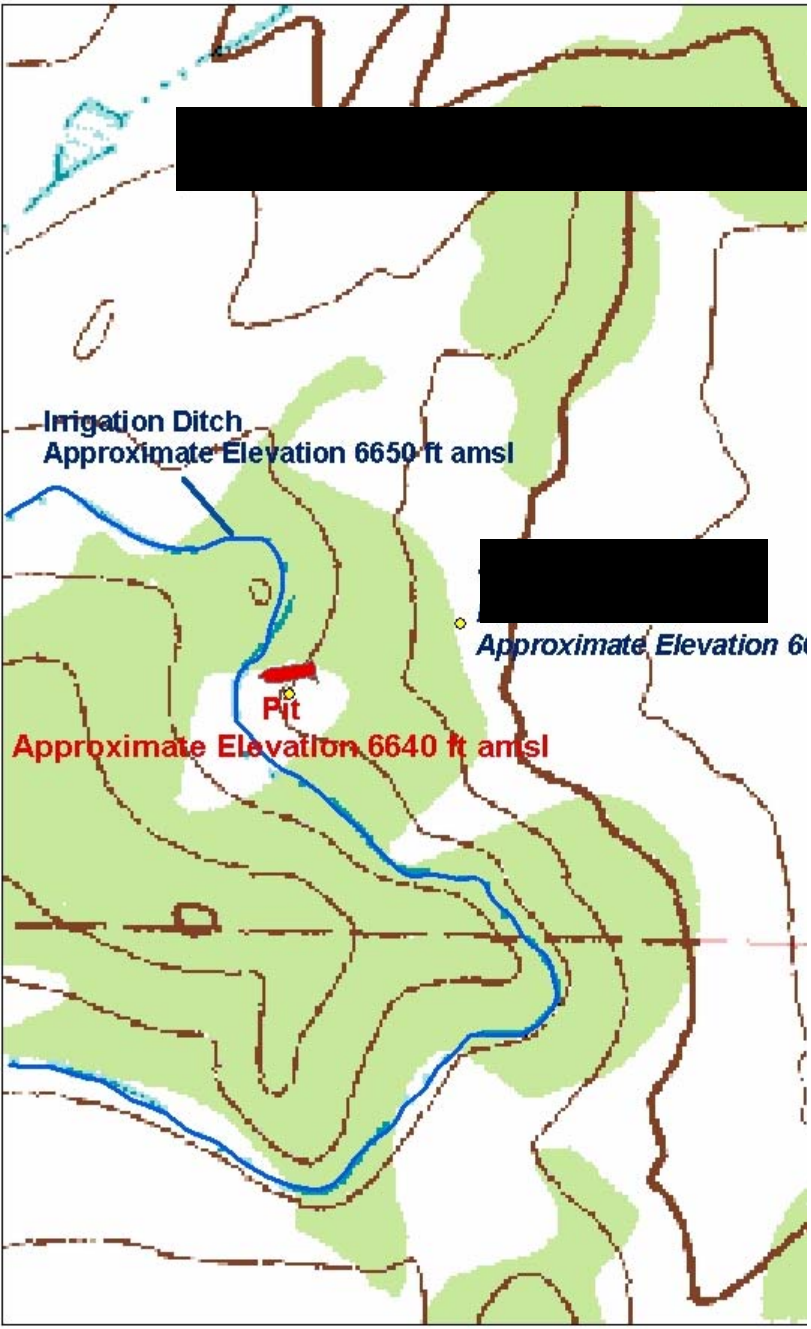
Currently, the Ground Water Commission has established eight designated basins and 13 Ground Water Management Districts (GWMDs) within such basins. A diagram and a listing of these basins and districts are shown below. Also included are contact information for each GWMD.

The GWMDs are authorized to adopt additional rules and regulations to help administer ground water within their district. To view these individual GWMD Rules and Regulations, click on the GWMD name below.

Designated Ground Water Basin	Ground Water Management Districts (Click Below for Rules)	GWMD Contact Information
Kiowa-Bijou	North KiowaBijou	Loyd Musgrave (970) 483-5652
Southern High Plains	Southern High Plains	Don Wood (719) 326-5244 dwood11@centurytel.net
Upper Black Squirrel Creek	Upper Black Squirrel Creek	Tracy Doran (719) 347-0704 ubscgwmd03@aol.com
Lost Creek	Lost Creek	Thomas Sauter (303) 644-3314 sauter@esrta.com
Camp Creek	-	-
Upper Big Sandy	Upper Big Sandy	Angela Wingard (719) 541-2669 ubsgwmd@bigsandytelco.com
Upper Crow Creek	-	-
Northern High Plains	Plains Rule 14A	Deb Daniel (719) 346 8487 pgwmd@centurytel.net

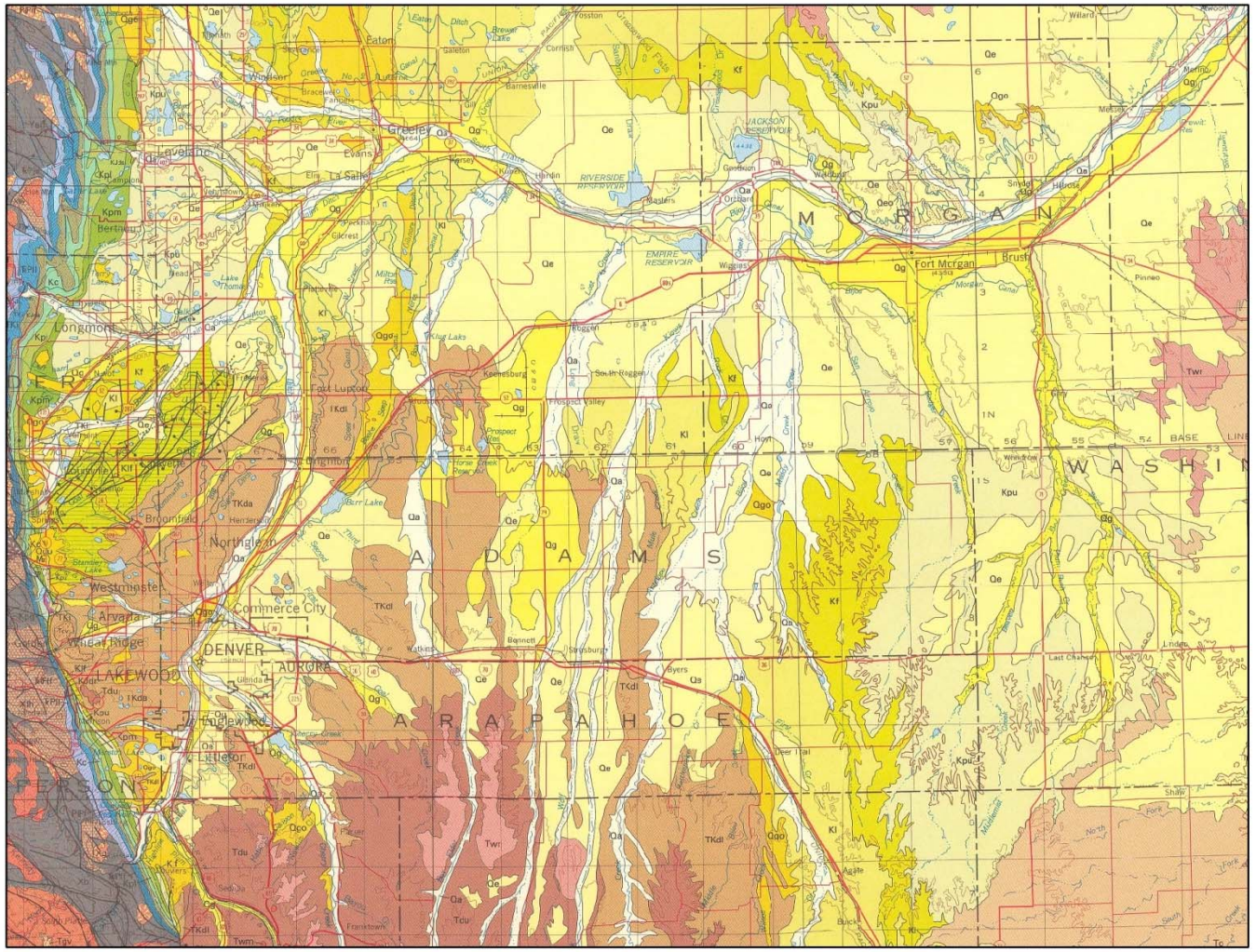
Hydrologic & Topo Data - COGCC Website




[redacted]
Irrigation Ditch
Approximate Elevation 6650 ft amsl
[redacted]
Approximate Elevation 6
Pit
Approximate Elevation 6640 ft amsl


Using COGCC Website Tools
Justin Zufe
Permit
Irrigation Ditch
Approximate Elevation 6650 ft amsl
Water Well
Approximate Elevation 6610 ft amsl
Screened Interval 12 ft to 160 ft bgs
Thomson Stock Pond
Pit
Approximate Elevation 6640 ft amsl

Geological Maps



Pit Rules

100. Pit Definitions

902. General And Special Rules For Pits

903. Pit Permitting/Reporting Requirements

904. Pit Lining And Specifications

100 - Definitions

- **Pit:**
  - Any natural or man-made depression in the ground surface used for oil and gas exploration or production.
  - Does not include steel, fiberglass, concrete or other similar vessels.
- Types:

1. Drilling
2. Production
3. Special Purpose
4. Multi-well

100 – Definitions (Cont'd)

- **Drilling. Pits used during drilling operations and initial completion of a well:**
  1. Ancillary: Contain fluids during drilling operations and initial completion procedures such as circulation and water storage pits (including fresh water).
  2. Completion: Contain fluids and solids produced during initial completion procedures (not originally constructed for use during drilling operations).
  3. Flow back: Contain fluids and solids produced during initial completion procedures.
  4. Reserve: Used to store drilling fluids in use in drilling operations or to contain E&P waste generated during drilling operations and initial completion procedures.

100 – Definitions (Cont'd)

- **Production. Pits used after drilling operations and initial completion of a well.**
  1. Skimming/Settling: Pits used to provide retention time for settling of solids and separation of residual oil for the purpose of recovering the oil or fluid.
  2. Produced Water: Pits used to temporarily store produced water prior to injection for enhanced recovery or disposal, offsite transport, or surface water discharge.
  3. Percolation: Pits used to dispose of produced water by percolation through the bottom or sides of the pit into surrounding soils.
  4. Evaporation: Pits used to contain produced water which evaporates into the atmosphere by natural thermal forces.

100 – Definitions (Cont'd)

- **Special Purpose. Pits used in oil and gas operations which constitute**:
  1. Blowdown: Pits used to collect material resulting from including to but not limited to the emptying or depressurization of wells, vessels, or gas gathering systems.
  2. Flare: Pits used exclusively for flaring of gas.
  3. Emergency: Pits used to contain liquids during an initial phase of emergency response operations related to a spill or release or process upset conditions.

100 – Definitions (Cont'd)

- **Special Purpose Pits :**
  4. Basic Sediment/Tank Bottoms: Pits used to ***temporarily*** store or treat the extraneous materials in crude oil which may settle to the bottom of tanks or production vessels and which may contain residual oil.
  5. Workover: Pits used to contain liquids during the performance of remedial operations of a producing well in an effort to increase production.
  6. Plugging Pits: Pits used for containment of fluids encountered during the plugging process.

100 – Definitions (Cont'd)

- **Multi-well pits: Pits used for treatment, storage, recycling, reuse or disposal of E&P wastes:**
  - Generated from more than one well.
  - That do not constitute a Centralized E&P Waste Management Facility, and
  - That will be in use for no more than three years.

Rule 902

Pits - General and Special Rules

902. Pits – General And Special Rules

1. **Pits used for E&P of oil and gas have to be constructed & operated to:**
   - Protect public health, safety, welfare, the environment including soil, waters of the state and wildlife from:
   - Significant adverse environmental, public health or welfare impacts from E&P wastes.

902. Pits – General And Special Rules (Cont'd)

2. **Pit Construction, Operation and Monitoring.**
   - Maintain minimum of 2 feet of freeboard
     - at all times
     - Measure from the top of the pit wall (at lowest elevation) to fluid level of pit.
   - Employ a method for monitoring and maintaining freeboard.
   - Unauthorized releases from pits are subject to reporting requirements under Rule 906.

902. Pits – General And Special Rules (Cont'd)

3. Accumulation of Oil or Condensate

- Remove *any* accumulation of oil (includes) condensate within 24 hours.
- Maintain pits in good condition and control odors: (employ skimming, steam cleaning of exposed liners or other safe and legal methods as necessary).
- Only *de minimis* amounts of hydrocarbons may be present unless the pit is specifically permitted for oil or condensate recovery or disposal.

902. Pits – General And Special Rules (Cont'd)

4. **Accumulation of Oil or Condensate**
   - The Pit Permit may be revoked by the Director, or
   - Director may require that the pit be closed if.
     - An operator repeatedly allows more than *de minimis* amounts of oil or condensate to accumulate on pit.
     - Does not apply to properly permitted fenced, lined, and netted skim pits, designed, constructed and operated to prevent impacts to wildlife including migratory birds.

902. Pits – General And Special Rules (Cont'd)

5. **Operators required to install appropriate netting and/or fencing where:**

   - Necessary to protect public health safety and welfare:
   - To prevent significant adverse environmental impacts resulting from access to a pit by wildlife, migratory birds, domestic animals or members of general public.

902. Pits – General And Special Rules (Cont'd)

6. Multi-well pits

- Pits used for a period of no more than three years (or more than three years if the Director has issued a variance).
- For storage, recycling, re-use, treatment or disposal of E&P waste or fresh water.
- May be permitted in accordance with Rule 903 to service multiple wells, subject to Director.

902. Pits – General And Special Rules (Cont'd)

7. **Unlined Pits:** **Cannot be constructed in fill.**
8. **Unlined pits:** Cannot be located in areas where pathways for communication with groundwater or surface water are likely to exist except as allowed under 904.a.
9. **Produced water:** has to be treated to remove oil and condensate prior to placement in a production pit [907. c.(1)].
10. **Bacterial Control**: **Utilize appropriate biocide to control bacterial growth and related odors.**

Rule 903

Pit Permitting

903 - Pit Permitting/Reporting Requirements

- Earthen Pit Report/Permit Application, COGCC Form 15.
  - Submit Pit Permit Application for prior approval.
  - Submit Pit Report within 30 days after construction.
  - Complete Form in accordance with Appendix I.
    - Failure to complete Form 15 and submit all attachments may delay approval and or return of form.
    - Goal is to review and approve permits accurately and complete permit applications within 30 days after receipt.

903. Pit Permitting/Reporting Requirements

Report

Permit Application

FORM 15 Rev 6/10

Click here to reset form

State of Colorado
Oil and Gas Conservation Commission

1120 Lincoln Street, Suite 801, Denver, Colorado 80203 (303)894-2100 Fax:(303)894-2109

FOR OGCC USE ONLY

EARTHEN PIT REPORT/PERMIT

This form is to be used for both reporting and permitting pits. Rule 903 describes when a Permit with prior approval, or a Report within 30 days, is required for pits. Submit required attachments and forms.

Complete the Attachment Checklist:

	Oper	OGCC
Detailed Site Plan		
Topo Map w/ Pit Location		
Water Analysis (Form 25)		
Source Wells (Form 26)		
Pit Design/Plan & Cross Sect		
Design Calculations		
Sensitive Area Data(s)		
Mud Program		
Form 2A		

FORM SUBMITTED FOR:

☐ Pit Report ☐ Pit Permit

OGCC Operator Number: _____ Contact Name and Telephone: _____

Name of Operator: _____ No: _____

Address: _____ Fax: _____

City: _____ State: _____ Zip: _____

API Number (of associated well): _____ OGCC Facility ID (of other associated facility): _____

Pit Location (Qtr/Qtr, Sec, Twp, Rng, Meridian): _____

Latitude: _____ Longitude: _____ County: _____

Pit Use: ☐ Production ☐ Drilling (Attach mud program) ☐ Special Purpose (Describe Use): _____

Pit Type: ☐ Lined ☐ Unlined Surface Discharge Permit: ☐ Yes ☐ No

Offsite disposal of pit contents: ☐ Injection ☐ Commercial Pit/Facility Name: _____ Pit/Facility No: _____

Attach Form 26 to identify Source Wells and Form 25 to provide Produced Water Analysis results.

Existing Site Conditions

Is the location in a "Sensitive Area?" ☐ Yes ☐ No Attach data used for determination.

Distance (in feet) to nearest surface water: _____ ground water: _____ water wells: _____

LAND USE (or attach copy of Form 2A if previously submitted for associated well) Select one which best describes land use:

Crop Land: ☐ Irrigated ☐ Dry Land ☐ Improved Pasture ☐ Hay Meadow ☐ CRP

Non-Crop Land: ☐ Rangeland ☐ Timber ☐ Recreational ☐ Other (describe): _____

Subdivided: ☐ Industrial ☐ Commercial ☐ Residential

SOILS (or attach copy of Form 2A if previously submitted for associated well)

Soil map units from USNRCS survey: Sheet No: _____ Soil Complex/Series No: _____

Soils Series Name: _____ Horizon thickness (in inches): A: ; B: ; C:

Soils Series Name: _____ Horizon thickness (in inches): A: ; B: ; C:

Attach detailed site plan and topo map with pit location.

Pit Design and Construction

Size of pit (feet): Length: _____ Width: _____ Depth: _____

Calculated pit volume (bbls): _____ Daily inflow rate (bbls/day): _____

Daily disposal rates (attach calculations) Evaporation: _____ bbls/day Percolation: _____ bbls/day

Type of liner material: _____ Thickness: _____

Attach description of proposed design and construction (include sketches and calculations).

Method of treatment of produced water prior to discharge into pit (separator, heater treater, other): _____

Is pit fenced? ☐ Yes ☐ No Is pit netted? ☐ Yes ☐ No

I hereby certify that the statements made in this form are, to the best of my knowledge, true, correct, and complete.

Print Name: _____ Signed: _____

Title: _____ Date: _____

OGCC Approved: _____ Title: _____ Date: _____

CONDITIONS OF APPROVAL, IF ANY:

FACILITY NUMBER:

903. Pit Permitting - Drilling Pits

Fluids	Pit Permit Application
TPH concentration > 10,000 ppm.	Form 15 Required.
Chloride concentration >15,000 ppm at total depth.	Form 15 Required.
TPH concentration < 10,000 ppm and chloride concentration <15,000 chloride.	Form 15 not required.
Water based bentonitic drilling fluids TPH below 10,000 and chlorides below 15,000	Form 15 not required.

903. Pit Permitting - Drilling Pits (Cont'd)

- Multi-well pit: Multi use, (ancillary, flowback, reserve, completion and circulation and production), re-use, recycling, treatment, storage, disposal.
- Form 15 Required.
- Exception: Where re-use consists of moving drilling fluids from one oil and gas location to another location for reuse there.
  - Permitting based on TPH, chloride concentrations or fluid type.
    - TPH >10,000 - Pit Permit Required.
    - Chloride concentrations at total depth >15,000 ppm - Pit Permit required.
    - Water-based bentonitic drilling mud – Form 15 not required.
  - Pit details and fluids program has to be included on Form 2A or CDP.
  - Pit cannot be in operation for more than 3 years.

903 - Pit Permitting Drilling Pit

EXAMPLE 1

- Drilling Pit
  - Water based bentonitc drilling mud to be used.
  - Chloride concentrations at depth expected to be less than 15,000 ppm.
  - Pit will:
    - be in use for less than 3 years.
    - not contain drilling &/ completion &/ flowback &/produced water that will be recycled or reused.
    - have not multiple uses prior to closure (reserve pit &/ drilling pit &/ completion pit &/ flowback &/ produced water management &/ fresh water storage).
  - Form 15 Not Required.
    - Close pit per 1003 series rules and do not use as special purpose or production pit.

903 - Pit Permitting Drilling Pit

EXAMPLE 2

- Multi-well pit
  - Pit located on multi-well pad.
  - Pit will be in use for less than 3 years.
  - Pit will contain drilling &/ completion &/ flowback &/produced water that will be recycled or reused.
  - Pit will have multiple uses prior to closure (reserve pit &/ drilling pit &/ completion pit &/ flowback &/ produced water management &/ fresh water storage).
  - Pit permit required, Submit Form 15.

903 - Pit Permitting Multi-Well Drilling Pit

EXAMPLE 3

- Pit will:
  - be in use for less than 3 years.
  - receive fluids from more than one well.
  - contain drilling fluids, or completion fluids that will be recycled or reused.
- Re-use consists only of moving drilling fluids from one (1) oil and gas location to another such location for reuse there.
- TPH less than 10,000 ppm and chlorides less 15,000 ppm.
- Form 15 Pit Permit not required.
- Pit details and drilling fluid program included on Form 2A

903 - Pit Permitting Drilling Pit

EXAMPLE 4

- Pit will receive drill cuttings for burial.
- Drill cuttings will be suitably dry so that fluids will not impact subsurface soils or migrate to surface).
- Drill cuttings meet COGCC Table 910-1 standards.
- Form 15 Pit Permit not required.
- Pit details and drilling fluid program included on Form 2A.

903 - Pit Permitting Production Pits

- Form 15 Pit Permit Required for all:
  - Percolation Pits
  - Evaporation Pits
  - Skim Pits
  - Production Pits
  - Multi-well pits

903 - Production Pits

EXAMPLE 1

- Multi-well production pit
  - Operator has variance from Director to operate pit for more than 3 years.
  - Pit will receive produced water. only
  - Disposal through percolation.
  - Produced water is equivalent to or better than underlying groundwater, or

Multi-well Production Pit Examples

- Operator can demonstrate by substantial evidence that seepage will not reach the underlying aquifer or waters of the state at contamination levels in excess of applicable standards.
- This pit can be permitted with Form 15 as a production pit.
- A Form2A is also required.

Multi-well Production Pit Examples

(EXAMPLE 2

- Multi-well pit
  - Pit will be in use for more than 3 years.
  - Operator does not have variance from Director to operate pit for more than 3 years .
  - Pit will receive E&P waste for treatment or disposal.
  - Pit receives waste from more than one operator under a JOA.
  - Permit as Centralized Waste E&P Waste Management Facility. See Rule 908.

Multi-well Production Pit Examples EXAMPLE 3

- Multi-well pit
  - Pit will be in use for more than 3 years.
  - Operator does not have variance from Director to operate pit for greater than 3 years .
  - Pit will only receive E&P waste for treatment or disposal
  - Pit receives waste from more than one operator not part of JOA.
  - Pit is commercial disposal facility – permit through CDPHE.

903 – Special Purpose Pits

- Form 15 Pit Permit Required for:
  - Workover Pits
  - BS&W
  - Blowdown
  - Plugging
  - Flare Pits – if there is a risk of condensate accumulation

903 – Special Purpose Pits (Cont'd)

- Form 15 Pit Report Required for:
  - Emergency Pits used in *initial* stages of emergency response operations.
  - Flare Pits where there is no risk for condensate accumulation.
  - Submit Form 15 as Report within 30 days of construction.

Rule 904

Pit Lining

904 - Pit Lining Requirements & Specifications

- **Pits Required to Be Lined:**

  The following pits shall be lined if they are constructed on or after May 1, 2009 on federal land or on or after April 1, 2009 on other lands.

  1. **<u>Drilling pits</u>:** with TPH concentrations exceeding 10,000 ppm and or 15,000 ppm chloride.
  2. **<u>All Production Pits</u>:**
     - Unless the operator demonstrates to the Director's satisfaction that the quality of the produced water is equivalent to or better than that of the underlying groundwater or,

904 - Pit Lining Requirements & Specifications (Cont'd)

- The operator can be clearly demonstrate by substantial evidence that seepage will not reach the underlying aquifer of waters of the state at contamination levels in excess of applicable standards.

- ***Subject to rule 901.(c).*** This requirement shall not apply to such pits in Washington, Yuma, Logan, Huerfano or Las Animas Counties constructed before May 1, 2011.
- ***901.c. Additional Requirements:*** The Director may require operator to conduct sensitive are determination , sampling and analysis, monitoring, remediation or installation of POC to evaluate potential for impacts to groundwater and surface water.

904 - Pit Lining Requirements & Specifications (Cont'd)

3. **All Special Purpose Pits**
   - Except emergency pits constructed during *initial* emergency response to spills/releases .
   - Flare pits where there is no risk of condensate accumulation.
4. **All Skim Pits**
5. **Multi-well pits:** used to contain produced water, drilling fluids, or completion fluids that will be recycled or reused.

904 - Pit Lining Requirements & Specifications (Cont'd)

- **Multi-well pit Exceptions**
  - Where it is used as a multi-well production pit in accordance with 904.a.(2).
  - Where reuse consists only of moving drilling fluids from one on and gas location to another location for reuse there.
- **Pits at Centralized E&P Waste Management facilities**
- **Pits at UIC facilities**

904 - Pit Lining Specifications

1. Liners:
   - Synthetic material, impervious, high puncture and tear strength adequate elongation and is resistant to deterioration by ultraviolet light and weathering.
2. Lining Systems:
   - Designed and constructed, installed, & maintained per manufacturers' specifications and good engineering practices.
3. Field Seams:
   - Must be installed and tested in accordance with manufacturer specification and good engineering practices.
   - Test results must be maintained by the operator and provided to the Director upon request.

904 - Pit Lining Specifications (Cont'd)

- **Additional Specifications.**
  - The following additional specifications apply to pit lining systems unless:
  - An oil and gas operator demonstrates to the satisfaction of the Director that at a liner system offering equivalent protection to public health safety and welfare including the environment and wildlife resources will be used.

904 - Pit Lining Specifications (Cont'd)

Liners shall meet following specifications.

1. Minimum thickness of 24 mils.
2. Be synthetic or fabricated material.
3. The liner has to cover bottom and interior sides of the pit.
4. Edges secured with 12 inch deep anchor trench around the pit.
5. Anchor trench shall be designed to secure and prevent slippage or destruction of the liner material.

904 - Pit Lining Specifications (Cont'd)

Soil Liner Foundation

1. Constructed with soil.
2. Minimum thickness of 12 inches after compaction.
3. Covering the entire bottom and interior sides of the pit.
4. Hydraulic conductivity shall not exceed $1.0x10^{-7}$ cm/sec (after testing and compaction).
5. Compaction and permeability tests measured in the laboratory are to be maintained by operator and provided to Director upon request.

904 - Pit Lining Requirements & Specifications (Cont'd)

- **Alternative to Soil Liner Foundation.**
  - If double synthetic liner secondary liner system is used.
  - An alternative to soil liner can be employed.

    1. Constructed with bedding material that exceeds hydraulic conductivity of 1.0 x 10-7 cm/sec .
    2. Bottom and sides must padded with soil or synthetic matting type material and shall be free of sharp rocks or other materials that are capable of puncturing the liner.
    3. Each synthetic liner shall have minimum thickness of 24 mils.

904 - Pit Lining Requirements & Specifications (Cont'd)

- **Specifications for pits liners and lining systems at Centralized E&P Waste Management Facilities**
  - The following specifications apply to pits used at centralized waste management facilities unless:
    - An oil and gas operator demonstrates to the satisfaction of the Director at a liner system offering equivalent protection to public health safety and welfare including the environment and wildlife resources will be used.

904 - Pit Lining Requirements & Specifications (Cont'd)

- **Specifications for pits at Centralized E&P Waste Management Facilities.**
  - Liner specifications.
    1. Minimum thickness 60 mils.
    2. Synthetic or fabric material that covers bottom and interior sides of pit.
    3. Edges secured with at least 12 inch deep anchor trench around the perimeter.
    4. Anchor trench shall be designed to secure and prevent slippage an or destruction of the liner material.

904 - Pit Lining Requirements & Specifications (Cont'd)

- **Specifications for pits at Centralized E&P Waste Management Facilities.**
  - **Foundation for CWMF Pit Liner**
    1. Constructed with soil having minimum thickness of 24 inches after compaction.
    2. Covering the entire bottom and interior sides of the pit.
    3. Hydraulic conductivity shall not exceed 1.0×10^{-7} cm/sec.
    4. Compaction and permeability test results measured in the laboratory and field must be maintained by the operator and provided to the Director upon request.

904 - Pit Lining Requirements & Specifications (Cont'd)

- **Specifications for pits at Centralized E&P Waste Management Facilities.**
  - **Alterative to Soil Liner Foundation -CWMF**
    1. Secondary liner consisting of a geo-synthetic clay liner.
    2. Which is a manufactured hydraulic barrier typically consisting of bentonitic clay or other very low permeability material.
    3. Supported by geo-textiles of geo-membranes held together by needling, stitching, or chemical adhesives.

904 - Pit Lining Requirements & Specifications (Cont'd)

- **Leak Detection and Other Protective Measures**
  - In Sensitive Areas the Director may require:
    - Leak detection for pit or equivalent.
    - Increased record keeping.
    - Underlying gravel fill sumps and lateral systems.
    - Monitoring systems.
  - Decision shall consider surface and subsurface geology, use of potentially-affected ground water, the quality of the produced water, the hydraulic conductivity of the surrounding soils, the depth to groundwater, the distance to surface water and the type of liner.

Rule 905

Closure of Pits and Buried or Partially Buried Produced Water Vessels

905. Closure Of Pits, And Buried Or Partially Buried Produced Water Vessels

- **Rule 905.a.**
  - Drilling pits shall be closed in accordance with 1000 Series Rules. (Still covered in Rule 1003.d.)
- **Rule 905.b.**
  - Pits not used exclusively for drilling operations, buried or partially buried produced water vessels, and emergency pits must be closed in accordance with an approved Site Investigation Remediation Workplan, Form 27.
  - Emergency pits must be closed and remediated as soon as the initial phase of emergency response operations are complete or process upset conditions are controlled.

905. Closure Of Pits, And Buried Or Partially Buried Produced Water Vessels (Cont'd)

- **Rule 905.b.(1)**
  - Soil & ground water must meet concentration levels in Table 910-1.
- **Rule 905.b. (2) Pit evacuation**
  - Prior to backfilling & reclamation, E&P waste must be treated or disposed per Rule 907.

905. Closure Of Pits, And Buried Or Partially Buried Produced Water Vessels (Cont'd)

- **Rule 905.b.(3) Liner disposal**
  - Synthetic liners can not be buried, even if operator can get landowner approval, and must be disposed per CDPHE solid waste rules.
  - Constructed soil liners left in place must be treated to alleviate compaction & prevent an impermeable barrier & shall meet soil standards in Table 910-1.

Pit Liners Can No Longer Be Buried
Even If Operator Gets Land Owner Approval To Bury It.

905. Closure Of Pits, And Buried Or Partially Buried Produced Water Vessels (Cont'd)

- **Rule 905.b.(4).**
  - Soil beneath the low point of the pit must be sampled to verify no leakage.
  - Operator must collect samples for laboratory analysis.
  - Soil left in place must meet concentration levels in Table 910-1.

905. Closure Of Pits, And Buried Or Partially Buried Produced Water Vessels (Cont'd)

- **Rule 905.c. Discovery of spills/releases during closure.**
  - Report spill/release on Form 19 per Rule 906.
  - Leaking pits and buried or partially buried produced water vessels must be closed and remediated per Rule 909 (Site Investigation, Remediation, & Closure) & Rule 910 (Concentrations & Sampling)

905. Closure Of Pits, And Buried Or Partially Buried Produced Water Vessels (Cont'd)

- **Rule 905.d.**
  - Unlined drilling pits must be closed and reclaimed in accordance with 1000 Series rules.
  - Soils & ground water must meet the concentration levels in Table 910-1.

Rule 906

Spills and Releases

906. Spills and Releases

- **Rule 906.**
  - Updated, simplified, and clarified rule requirements.
- **Rule 906.a.**
  - Spills/releases of E&P waste shall be controlled & contained immediately
  - Impacts shall be investigated & cleaned up as soon as practicable.
- **Rule 906.b.1.**
  - Report > 5 bbl spills, including those contained within lined or unlined berms on Form 19.

906. Spills and Releases (Cont'd)

- **Rule 906.b.2.**
  - Spills/releases > 20 bbl spills must be:
    - Reported verbally as soon as practicable
    - But not more than 24 hours after discovery; and
    - Reported on a Form 19.
- **Rule 906.b.3.**
  - Spills/releases of any size that impact or threaten to impact waters of the state, structures, livestock, public byways must be:
    - Reported verbally as soon as practicable,
    - But not more than 24 hours after discovery; and
    - Reported on a Form 19.

906. Spills and Releases (Cont'd)

- **Rule 906.b.4.**
  - Spills/releases of any size that impact or threaten to impact any surface water supply area must be reported to the Director & the Environmental Release/Incident Report Hotline (1-877-518-5608).
  - Spills/releases that impact or threaten a surface water intake must be reported to the emergency contact for that facility immediately after discovery.

906. Spills and Releases (Cont'd)

- **Rule 906.b(5) - Form 19 for all reportable spills/releases**
  - Must be submitted within 10 days of discovery.
  - Must include a topo map showing location spill/release.
  - Must describe initial mitigation, site investigation, and remediation.
  - Director may require additional information.

906. Spills and Releases (Cont'd)

- **Rule 906.b.(6).**
  - Reminder that chemical spills & releases need to be reported in accordance with other applicable state & federal laws.

906. Spills and Releases (Cont'd)

- **Rule 906.c. Surface owner notification & consultation.**
  - The operator must notify the affected surface owner or the surface owner's appointed tenant of reportable spills as soon as practicable, but not more that 24 hours after discovery.
  - The operator must make good faith efforts to notify and consult with the affected surface owner, or the surface owner's appointed tenant, prior to commencing operations to remediate E&P waste from a spill/release in an area not being used for O&G operations.

906. Spills and Releases (Cont'd)

- **Rule 906.e. Spill/release prevention**
  - Secondary containment constructed before May 1, 2009 on federal land, or before April 1, 2009 on other land must comply with the rules in effect at the time of construction.

906. Spills and Releases (Cont'd)

- **Rule 906.e.**
  - Secondary containment constructed on or after May 1, 2009 on federal land, or on or after April 1, 2009 on other land must be constructed or installed around all tanks containing oil, condensate, or produced water >3,500 mg/l TDS (previously 10,000 mg/l).
  - Must be sufficient to contain the contents of the largest single tank and sufficient freeboard to contain precipitation. Also see Rules 603.e.(12) and 604.a.(4).
  - Secondary containment structures must be sufficiently impervious to contain discharged material.
  - Secondary containment not required for <50 bbl water tanks (previously <100 bbls).

Rule 907

Management of E&P Waste

907 - Management Of E&P Waste

- 907.a. General Requirements
- 907.b. Waste Transportation
- 907.c. Produced Water
- 907.d. Drilling Fluids
- 907.e Oily Waste
- 907.f – Other E&P Wastes
- 907A – Management of Non-E&P Waste

907.a.(3) - Reuse and Recycling

- Rule encourages and promotes waste minimization.
  - Operators are allowed to manage E&P waste through beneficial use, reuse and recycling.
  - Required to submit a Waste Management Plan (WMP).

907.a.(3) - Re-use and Recycling

- New Rule 907.a.(3)
  - Requires operators to submit a Form 4 Sundry Notice with the WMP.
  - Adds statement that the Director may require additional information.

907.b.(1) E&P Waste Transported Offsite

- Statement added that E&P Waste transported outside of Colorado for treatment or disposal shall be transported to facility authorized and permitted by the appropriate agency in receiving state.

907.b.(2) - Waste Generator Requirements

- New Rule
  - Requires that Generators of E&P waste that is transported off-site maintain for 5 years copies of *invoices, bill, tickets or other such records* describing:
    - The date of transport;
    - Identify of waste generator;
    - The identify of waste transporter;
    - Location of the waste pickup site;
    - Type and volume of waste;
    - Name and location of treatment or disposal site.

907.b.(2) - Waste Generator Requirements (Cont'd)

- New Rule
  - Makes the record retention time of 5 years consistent with the same requirement in Rule 205 – Access to Records.
  - Adds a requirement that records currently being maintained (bill, ticket or invoice) be signed by the Transporter.


Drilling Fluids
River
River Bank

907.c. Produced Water

- Former Rule 907.c.(2)D
  - Road spreading of produced water on lease roads as disposal method if total dissolved solids (TDS) concentrations are 5,000 mg/l or less.
- New Rule 907.c.(2)D.
  - Lowers TDS requirements to 3,500 mg/l or less.
  - Flowback fluids shall not be used for dust suppression.

907.c. Produced Water

- 907 .c.(2)E. i. Discharge Permit Information
  - Requires operator to provide permit #, lat/long, source of produced water on a Form 26 and a USGS topographic map with location of the outfall - COGCC requests notification when the discharge is discontinued.
- 907 .c.(2)E ii. Beneficial Use
  - Produced water may be put to beneficial use in accordance with applicable state statutes and regulations governing the use and administration of water.

907.c. Produced Water

- New Rule 907.c.(2) F.
  - Adds evaporation in a properly lined pit at a Centralized E&P Waste Management Facility permitted in accordance with Rule 908 as a disposal option.

907.d. Drilling Fluids

- Rule 907.d.(3)
  - Original rule provided for additional authorized disposal options for water-based bentonitic drilling fluids.
  - Rule 907 .d.(3)A
    - Allows for drying and burial in pits on non-cropland.
    - New requirement: the resulting concentrations shall not exceed allowable levels in Table 910-1.

907.d.(3).B Land Application

- Former Rule: Allowed for land application including the lining of stock ponds and irrigation ditches.
  - New Rule 907.d.(3)B.i.
    - Eliminates lining of stock ponds and irrigation ditches as an allowable land application, unless a WMP is submitted and approved by COGCC in accordance with Rule 907.a.(3).

Gravel pit improperly used for drilling fluid disposal

Colorado Oil & Gas Conservation Commission

907.d.(3).B - Land Application

- Rule 907.d.(3)B.ii. Land Application
  - Water-based bentonitic drilling fluids shall be incorporated into native soil as a beneficial amendment within 10 days of application.
- Rule 907.d.(3)B.iv. Operator Obligations
  - Operators shall maintain a record of the source, the volume and location where the land application of the water–based bentonitic drilling fluids occurred.
  - Upon Directors written request this information shall be provided within 5 business days in readily reviewable format.

907.e - Oily Waste

- Waste management for materials containing crude oil, condensate or other E&P wastes that contain hydrocarbons.
  - Includes E&P wastes such as frac sand, hydrocarbon impacted soils, drilling fluids, drill cuttings and pit sludge.
  - Does not include tank bottoms, workover fluids, pigging wastes and gas gathering and gas plant wastes.
  - Waste Management for these waste types is outlined in Rule 907.f.

907.e. - Oily Waste (Cont'd)

Waste Management Options

1. Treatment or Disposal
   - Disposal at commercial solid waste disposal facility.
   - Land treatment onsite.
   - No offsite land treatment unless it is included in Waste Management Plan approved by Director.
2. Land Treatment Requirements
   - Remove free oil from oily waste PRIOR to land treatment.
   - Prevent contamination of: groundwater, surface water or storm water.
   - Land-treatment of oily waste incorporated in place or beneficially used shall not exceed concentrations in Table 910-1

907.e. - Oily Waste

3. Land treatment Requirements
   - Biodegradation shall be enhanced by disking, tilling, aerating or addition of nutrients, microbes, water or other amendments.
   - Obtain surface owner approval.
   - When a threatened or significant adverse environmental impact from onsite land treatment exists:
     - Submit a Form 27 Site Investigation Remediation Workplan for approval by the Director.
     - Treatment thereafter be completed in accordance with rule 909 ands 910.

907.f - Other E&P Wastes

- Work over fluids, tank bottoms pigging wastes and natural gas plant gas gathering, processing and storage waste may be disposed of as follows:

1. Disposal of at commercial solid waste facility.
2. Treatment at centralized E&P Waste management facility.
3. Injection into Class II UIC well permitted in accordance with Rule 325.
4. Alternative method proposed in waste management plan.

907.f - Other E&P Wastes

907.f - Other E&P Wastes

907.f - Other E&P Wastes

907A. - Management of Non-E&P Waste

a. **Certain wastes generated by oil and gas related activities:**
   - Are non-E&P wastes and are not exempt from regulation as solid or hazardous wastes.
   - These wastes need to be properly identified and disposed of in accordance with state and federal regulations.

b. Certain wastes generated by oil, gas-related activities can either be E&P wastes or non E&P wastes depending on the circumstances of their generation.

907A. - Management of Non-E&P Waste (Cont'd)

c. Hazardous waste regulations

- All non-hazardous/non E&P waste are considered solid waste which require storage, treatment and disposal in accordance with 6 C.C.R 1007-2.
- Require that a hazardous waste determination be made for any non-E&P solid waste.
- Hazardous waste require storage, treatment and disposal in accordance with 6 C.C.R 1007-3.

Rule 908

Centralized E&P Waste Management Facilities

908 - Centralized E&P Waste Management Facilities

- Major Change – All New CE&PWMFs subject to new Form 2A requirements (Rule 303.d)
- 908 Applicability Old Rule - Current Rule (no change)
  - 908.a. Applicability. Allows operators to establish noncommercial E&P Waste management facilities.
    - Receive wastes exclusively from one operator or
    - Waste from unitized area,
    - Wastes from multiple operators under joint operating agreement,
    - In response to an emergency.
  - Can include land treatment or land application sites, pits and recycling equipment

908 - Centralized E&P Waste Management Facilities (Cont'd)

Rule 908.b. - Permit requirements.

- Largest changes are focused on Facility Engineering Requirements [908.b (7)], requiring both ground water and surface water monitoring for all facilities [908.b (9)], and specific closure requirements (908.g)

908.b.(7) - Facility design and engineering requirements. Itemizes specific requirements including subsurface and surface water characterization and specific requirements for engineering data (liners, water diversion structures, etc.)

- 908.b (7) A – Geological data requirements
- 980.B (7) B – Hydrological and hydrogeological data requirements
- 908.B (7) C – Engineering data requirements
- 908.b.(8) Operating Plan - Has requirements for noise or odor mitigation.
- 908.b.(9) Ground water monitoring - Specific requirements for baseline ground water monitoring within 1 mile radius of the proposed facility (Domestic WW).

908 - Centralized E&P Waste Management Facilities (Cont'd)

908.b.(9) Ground water monitoring (con't)

- 908.b.(9)B.i. Site specific ground water monitoring to ensure compliance with allowable concentrations in Table 910-1. Unless operator demonstrates alternative method of equivalent protection (dual liners, leak detection, etc.)
- 908.b.(10) Baseline and periodic surface water sampling (where applicable).
- 908.b.(11) Contingency/emergency response Plan items detailed.

908 - Centralized E&P Waste Management Facilities (Cont'd)

- 908.f. Annual Reports. Operator required to submit report summary operation and types and volumes of waste.
- 908.g. Closure
  - 908.g.(1) A preliminary plan for closure shall be submitted with the centralized E&P waste management facility permit, Form 28. Includes specific plan requirements.
  - 908.g.(2) Final closure plan. A Site Investigation and Remediation Workplan, Form 27, shall be submitted at least sixty (60) days prior to closure for approval by the Director. Includes specific plan requirements.
  - Financial Assurance – Amount equal to estimated cost necessary to ensure proper reclamation closure/abandonment of the facility or by Commission Order or Director's agreement. Rule is retroactive and new bonding is required by July 1, 2009 for existing permitted facilities (Rule 704).

CE&PWMF
Garfield County

Rule 909

Site Investigation, Remediation, and Closure

909 - Site Investigation, Remediation, And Closure

- No substantive changes, only minor edits.
- Applies to:
  - the closure & remediation of pits
  - the investigation, reporting & remediation of spills/releases.
  - waste management facilities
  - plugged & abandoned wellsites
  - sites impacted by E&P waste management practices

909 - Site Investigation, Remediation, And Closure (Cont'd)

- Sensitive Area Determination.
- Sampling & analyses to determine extent of contamination.
- E&P waste managed per Rule 907.
- Soil & ground water remediated to Table 910-1concentrations
- Form 27
- Financial assurance may be held until required remediation of soil and ground water impacts is completed.

Rule 910

Concentrations and Sampling for Soil and Ground Water

910 - Concentrations And Sampling For Soil And Ground Water

- **No substantive changes, only minor edits.**
- **Acknowledges that analytical parameters will be selected based on site-specific conditions & process knowledge.**
- **Analytical parameters must be agreed to and approved by the Director.**

Table 910-1 - Allowable Concentrations And Levels

SOIL		GROUND WATER
No changes	***Changes***	***No changes***
• EC <4 mmhos/cm or 2x background • SAR <12 • pH 6-9	• TPH 500 mg/kg • BTEX & several other hydrocarbon compounds • Metals • (derived from CDPHE/HMWMD Evaluation Values Table 1)	• Standards set by CDPHE WQCC for ground water.

Table 910-1 - Allowable Concentrations And Levels (Cont'd)

WHY?

- Soil standards for O&G operations were different than those used by CDPHE HMWMD and solid waste unit for similar wastes from other industries.
- Rapid spread of rural residential development & urban sprawl.
- Changes in land use from ag, range, forest to residential & commercial.
- Need soil standards that are protective of new & future land uses.
- Expansion of O&G into challenging terrane with increased potential to impact surface & ground water.

Background Levels In Native Soils & Ground Water Are Considered

Table 910-1
CONCENTRATION LEVELS[1]

Contaminant of Concern	Concentrations
Organic Compounds in Soil	
TPH (total volatile and extractable petroleum hydrocarbons)	500 mg/kg
Benzene	0.17 mg/kg[2]
Toluene	85 mg/kg[2]
Ethylbenzene	100 mg/kg[2]
Xylenes (total	175 mg/kg[2]
Acenaphthene	1,000 mg/kg[2]
Anthracene	1,000 mg/kg[2]
Benzo(A)anthracene	0.22 mg/kg[2]
Benzo(B)fluoranthene	0.22 mg/kg[2]
Benzo(K)fluoranthene	2.2 mg/kg[2]
Benzo(A)pyrene	0.022 mg/kg[2]
Chrysene	22 mg/kg[2]
Dibenzo(A,H)anthracene	0.022 mg/kg[2]
Fluoranthene	1,000 mg/kg[2]
Fluorene	1,000 mg/kg[2]
Indeno(1,2,3,C,D)pyrene	0.22 mg/kg[2]
Napthalene	23 mg/kg[2]
Pyrene	1,000 mg/kg[2]
Organic Compounds in Ground Water	
Benzene	5 µg/l[3]
Toluene	560 to 1,000 µg/l[3]
Ethylbenzene	700 µg/l[3]
Xylenes (Total)	1,400 to 10,000 µg/l[3,4]
Inorganics in Soils	
Electrical Conductivity (EC)	<4 mmhos/cm or 2x background
Sodium Adsorption Ratio (SAR)	<12[5]
pH	6-9
Inorganics in Ground Water	
Total Dissolved Solids (TDS)	<1.25 x background[3]
Chlorides	<1.25 x background[3]
Sulfates	<1.25 x background[3]
Metals in Soils	
Arsenic	0.39 mg/kg[2]
Barium (LDNR True Total Barium)	15,000 mg/kg[2]
Boron (Hot Water Soluble)	2 mg/l[3]
Cadmium	70 mg/kg[3,6]
Chromium (III)	120,000 mg/kg[2]
Chromium (VI)	23 mg/kg[2,6]
Copper	3,100 mg/kg[2]
Lead (inorganic)	400 mg/kg[2]
Mercury	23 mg/kg[2]
Nickel (soluble salts)	1,600 mg/kg[2,6]
Selenium	390 mg/kg[2,6]
Silver	390 mg/kg[2]
Zinc	23,000 mg/kg[2,6]
Liquid Hydrocarbons in Soils and Ground Water	
Liquid hydrocarbons including condensate and oil	Below detection level